SIERRA CLUB

BAY ALIVE

Gita Dev

“Bay Alive” Campaign

Vice-Chair

Sea Level Rise - What we'll discuss today

New Law - SB 272

A **regional** SLR solution that includes Nature based Adaptation

Bay Ecosystems that we need and use everyday

Nature-based solutions we need to work with

Sea Level Rise Projections

Sea Level Rise (SLR) is projected every 5 years by the California Ocean Protection Council

SO WHAT CAN WE DO ABOUT IT

- First instinct - put up an **levee** or concrete sea wall to keep the water out as it rises

- However **living shorelines** are what keeps needed Bay eco-services alive

SB 272

New Law passed last year

- **Governance Gap**: SLR is regional, however there is no regional plan for adapting to SLR. Every city is on its own

- **Enter SB 272** which requires every local government with a bay or coast edge to have a SLR adaptation plan that follows regional guidelines and approved by BCDC or the Coastal Commission. Deadline Jan 1, 2034,

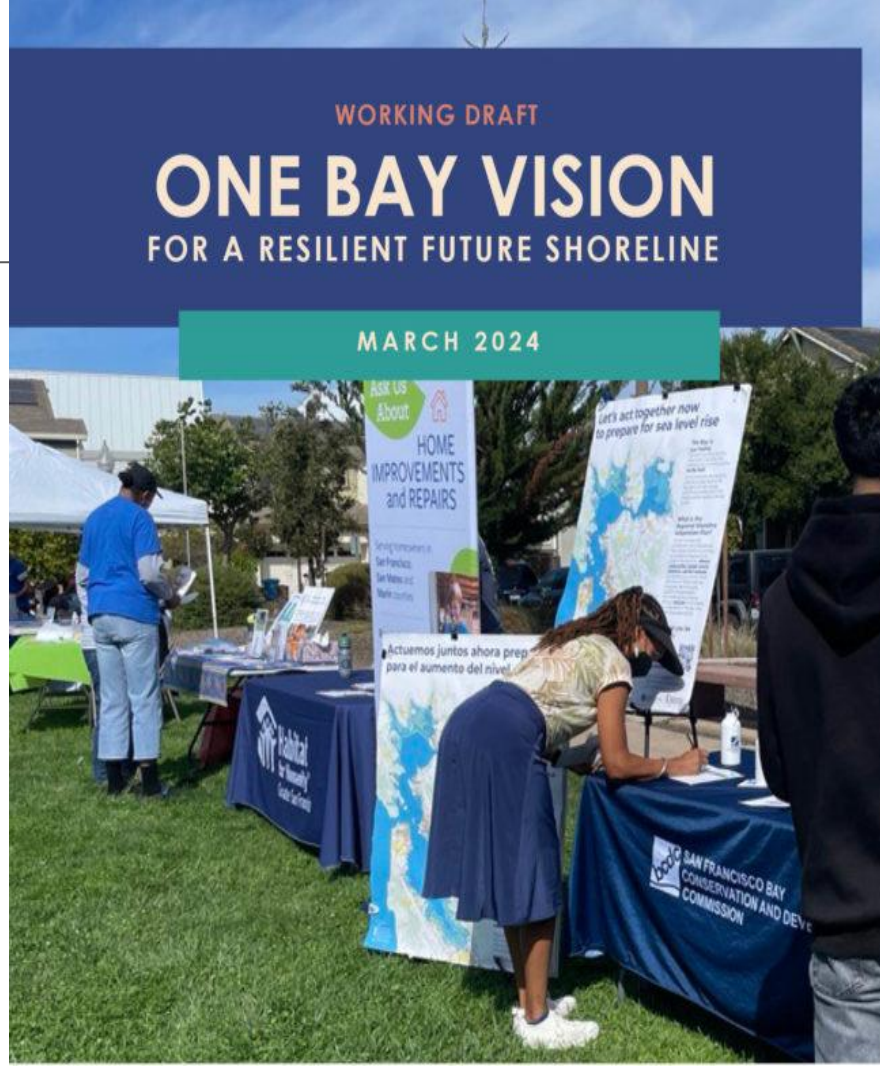
The “Regional Shoreline Adaptation Plan” (RSAP)

BCDC has been entrusted with developing the guidelines for approval in the Bay Area

The bay will be divided into **“Sub-regional”** areas, each with its own guidelines, maps and strategies that are appropriate

The 6 Bay Adapt goals include

- “**Put Nature First when possible**
- “**Support Vulnerable Communities**”



Put Nature First because Nature's Ecosystems are critical

The Bay quietly and efficiently provides a slew of ecological services

Without all its 'free' services we'd be in serious trouble.

Marshes provide Flood Control

Marshes absorb stormwater and hold it.

Marshes prevent waves from reaching the shore and eroding the land or levees

Marshes “grow” higher by trapping sediments and can keep up with sea level rise

A marsh in front of a levee keeps the much levee lower, as no waves can reach it

The Bay Cleans our Stormwater

Storm Water, with lots of pollutants, go into creeks

Creeks empty onto marshes & wetlands in the bay

Marshes trap dirt/sediment, absorb and remove pollutants, fertilizers, pesticides, heavy metals, toxic brake dust, tire dust

Clean Air

Fast-growing marsh plants take co2 from the air. Use the carbon to grow and release the oxygen.

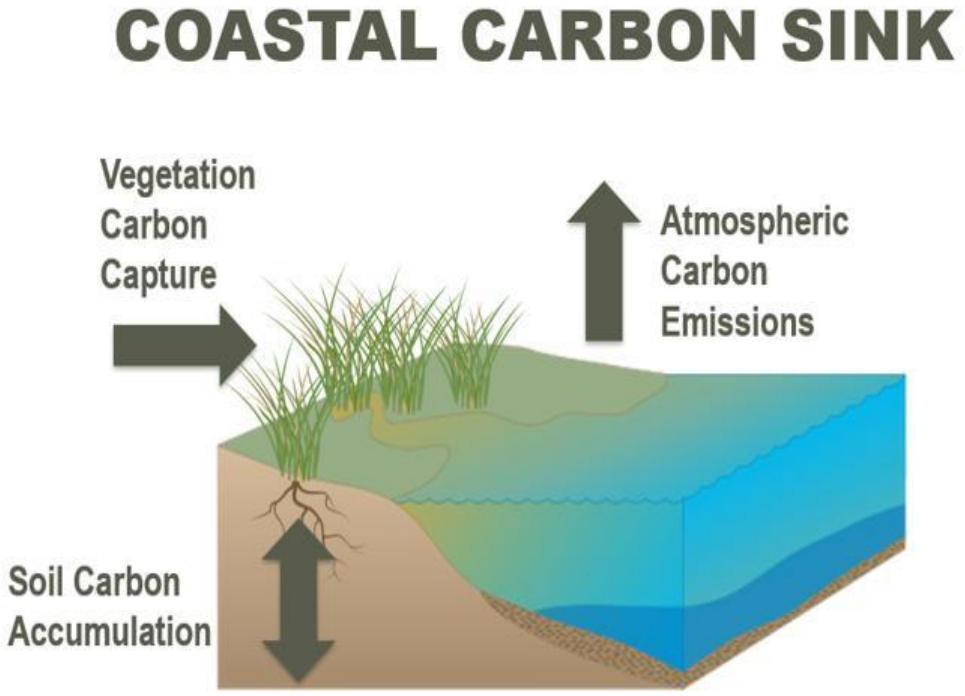
Eel grass meadows underwater take in co2 and release strings of bubbles of o2 when the sun is shining! Awesome to watch!

Climate Change - Carbon Capture & Storage

Carbon capture- as marsh plants grow they grab carbon to grow and in their roots

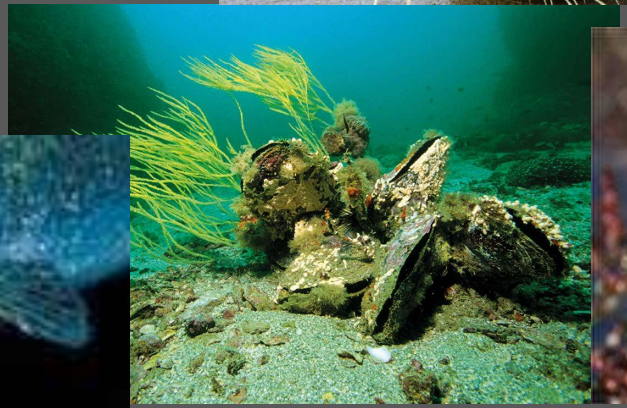
Carbon storage - underwater, dead anaerobic carbon can stay for hundreds of years

Some wetlands **sequester more carbon than tropical rainforests**



Wetlands invaluable for

Fish and wildlife habitat



Chinook Salmon

Including endangered species and species of special concern

So…we need
Wetlands & Shallow Water Habitat

1.

2.

3. **Without marshes, the web of life would be gone**

4. **along with all the ECOSERVICES**

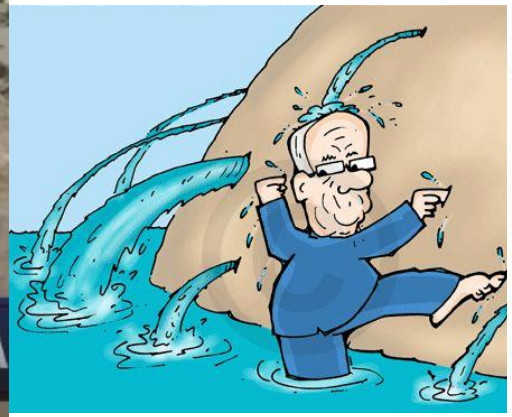
5. **that the Bay provides us**

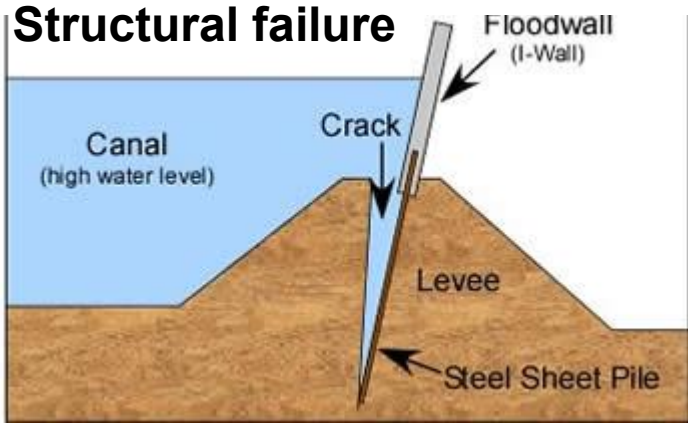
6.

7.

Sea Level Rise Solutions

"GREY" INFRASTRUCTURE Can have expensive problems and disrupt or destroy ecosystems





What are Nature-based Adaptation Solutions?

Actions that **harness biodiversity and ecosystem services** to **reduce vulnerability** and **build resilience** to climate change.

Eelgrass

Oysters

Mudflats

Marshes

Ecotone levee
(marsh + levee)

Range from fully natural → Hybrid (natural + engineered)

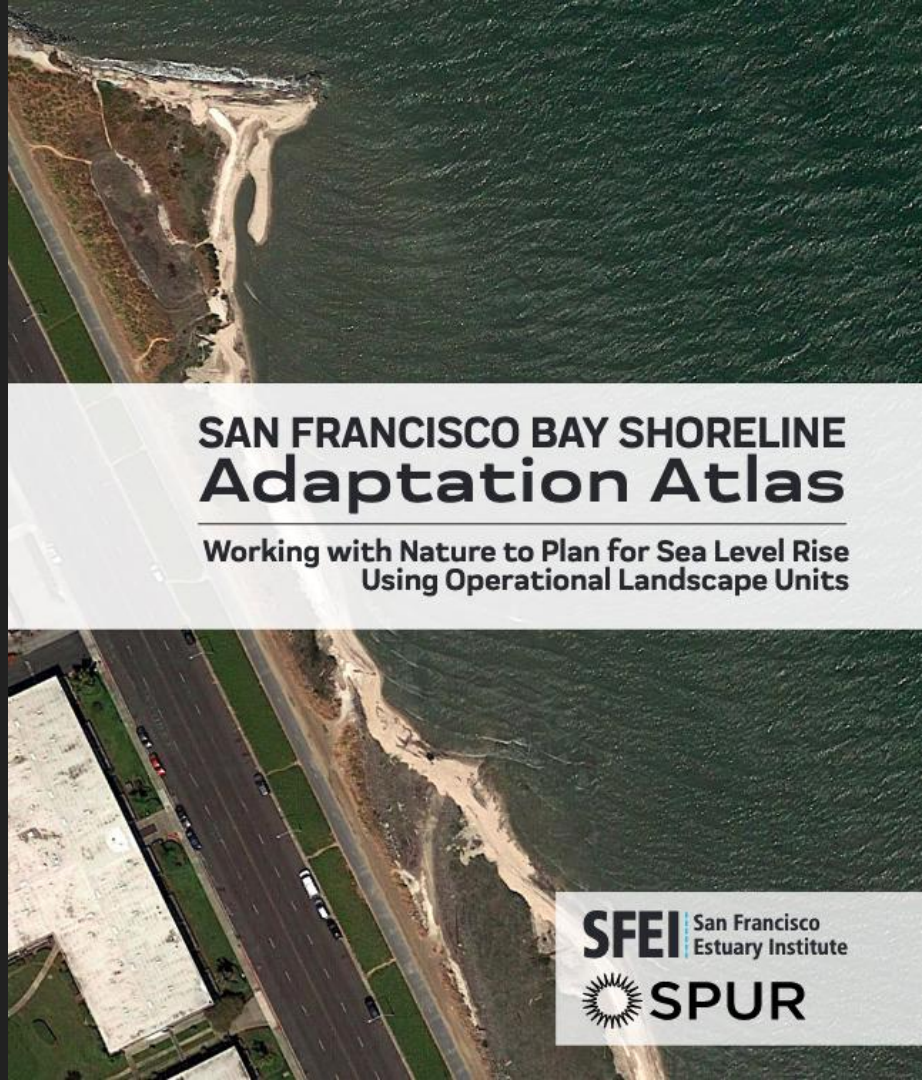
SFEI

ADAPTATION ATLAS

By SFEI and SPUR

A good place to start….

Used as a reference by all the agencies for Nature-based solutions unique to each part of the Bay

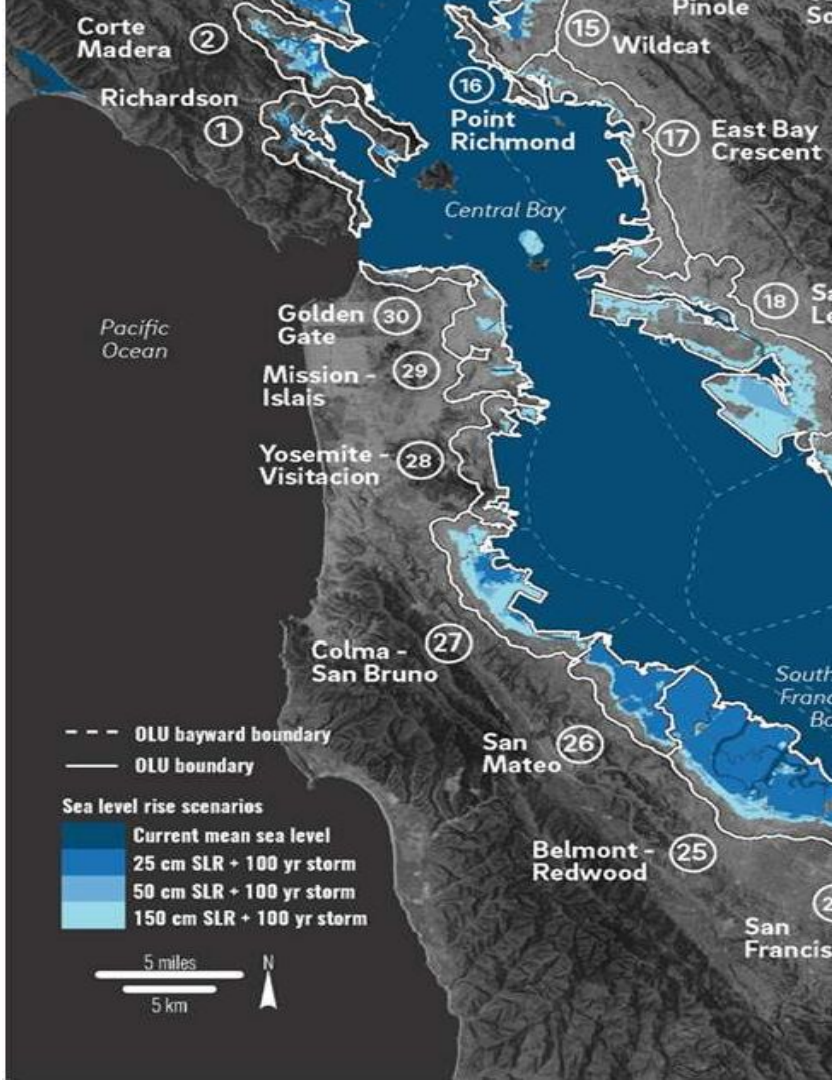


Nature's Boundaries

"Operational Landscape Units" (OLU)

Areas with shared geophysical and land use characteristics ***suited for a particular suite of nature-based measures***

Describes nature-based strategies for each OLU

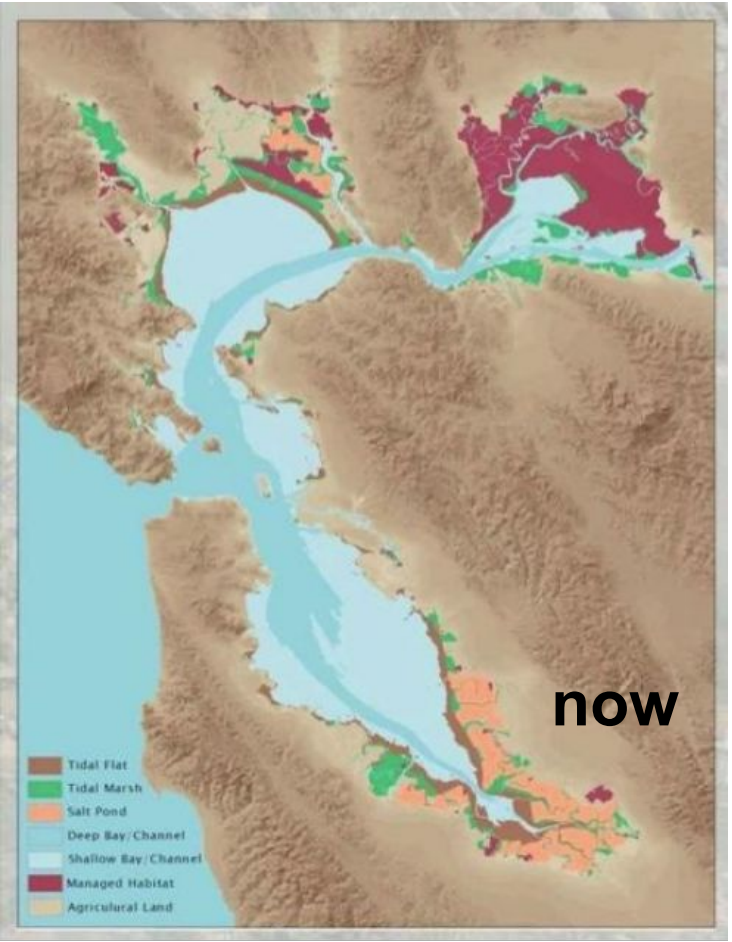


Adaptation Atlas SFEI

Tidal Wetlands - Mudflats and Marshes

Wetlands are areas where water is present at or near the surface all year or for varying periods, including the growing season

Tidal wetlands are at risk of drowning as sea levels rise



Marshes

95% of the living marshes have been filled in for development as our cities grew

Clean Sewage Water

Storm water -we saw it flows into marshes now and is cleaned

How about Sewage? - After 1972 only <u>treated</u> sewage allowed to go into the Bay. Now those plants are at end of life.

Treated sewage still has Nitrogen & other pollutants..As we grow, this is creating algae blooms and massive die-offs

2022-23

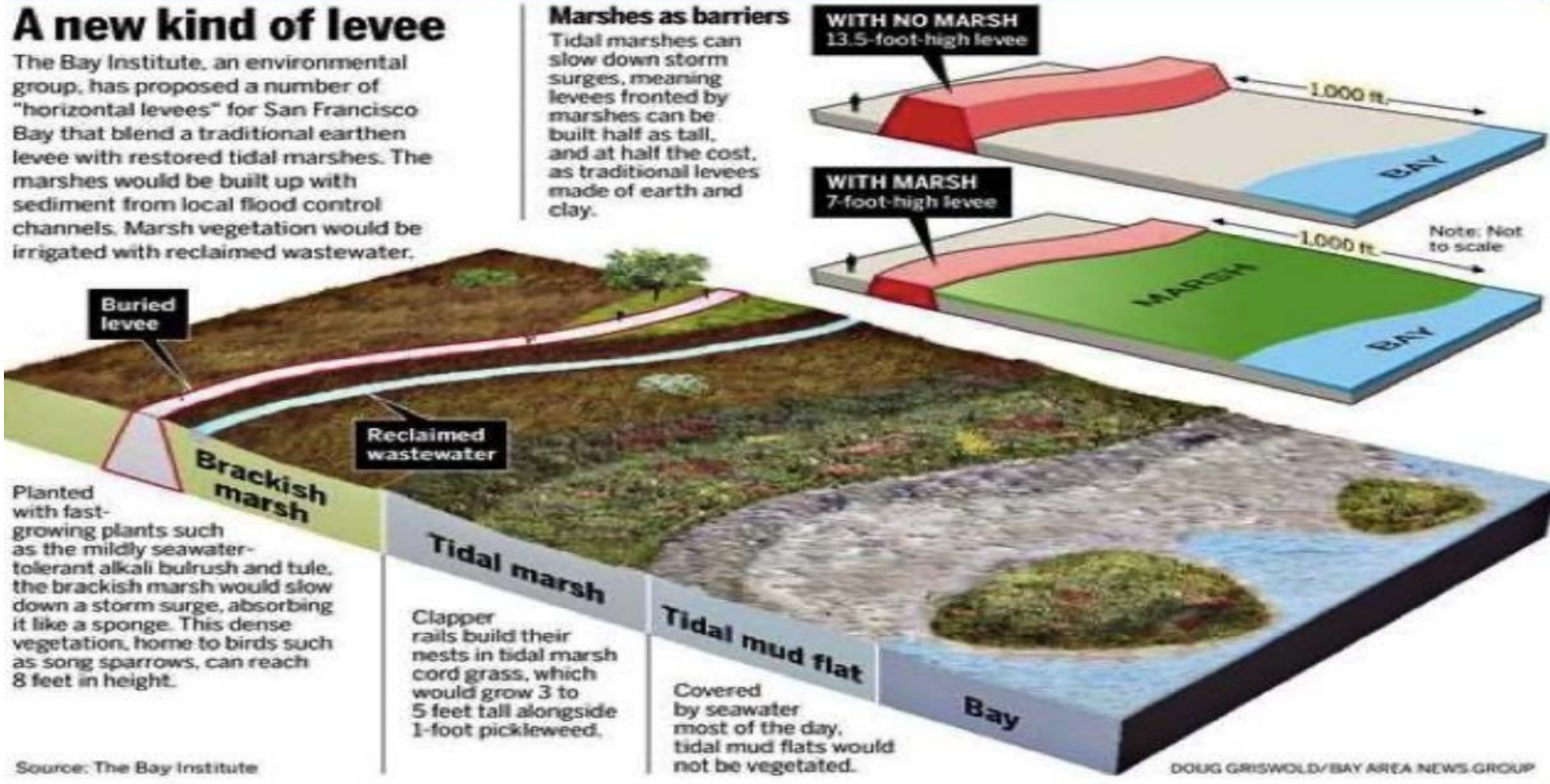
Starting June 2024 BAWQCB:

By 2034, the 37 wastewater treatment plants will have to reduce nitrogen fertilizer and sewage in their water by 40%

HOW?!

ECOTONE LEVEE removes 99% of pollutants

A very gently sloping vegetated slope on bayside of levee- the treated wastewater flows thru the soil, plant roots remove pollutants, levee can be low because marsh blocks waves



Use Ecotone Levees
to protect waste treatment plants from SLR

Removes 99% nitrogen and other pollutants

Flood Mitigation with Eelgrass Meadows

Eelgrass Meadows break up wave action, protect shorelines
And are nurseries for a rich biodiversity of water creatures


Eelgrass meadows

OYSTER REEFS WERE PROLIFIC IN THE BAY - REEFS protect against erosion

San Rafael Living Shoreline Project Over two million native oysters and eel grass have grown on Coastal Conservancy's Living Shoreline Reefs constructed in 2012

Oysters have tremendous ecological value! Each can filter 50 gallons of water a day clarifying and cleaning the water in the Bay

Aramburu Island, Marin
Augmenting a beach for erosion control

Beaches

Break wave action

SLR and Pollution Risk to Communities and the Bay

Rising seas and rising groundwater will inundate contaminated sites

Toxic Tides: UC Berkeley and UCLA analyzed how SLR will impact contaminated sites

These toxic sites are disproportionately located near vulnerable communities burdened by environmental injustice

Change our thinking?

Think about being able to **eat the food from the bay** and a lot of nature based solutions fall in place.

Rather than trying to **fight nature** to stop the water

Wouldn’t an Annual Oyster Festival at South City Oyster Point be great!

FUNDING and FEMA are working hard to keep up

- Agencies are retooling for new realization. We can’t engineer our way out of this without **paying unbearable costs**

The real costs:

- Lose flood mitigation with drowned living marshes and ecosystems
- Lose clean water - need to treat storm and sewer water with chemicals,
- Lose fresh bay air - lose oxygen, fresh breezes,cool weather
- Lose carbon capture -accelerate climate change instead of slowing it
- Lose Habitat -creates Biodiversity collapse
- Our health, vulnerable communities all pay the costs

We really need to keep the Bay Alive and make it healthier!

SIERRA CLUB

BAY ALIVE

Thank You!

Sea Level Rise Webinar

May 2021

Day 1

Webinar
Day 2

Webinar
Day 3

Jeremy Lowe
San Francisco
Estuary Institute

Josh Bradt
San Francisco
Estuary Partnership

Hon. Kevin Mullin
Assembly Speaker Pro
Tempore, District 22

"Greening the Project: Case Studies and Funding" Panel Two

Luisa Valiela
Environmental
Protection Agency

James Muller
San Francisco
Estuary Partnership

Alison Kearns
Federal Emergency
Management Agency

Nature-based Adaptation vs "Grey" Infrastructure

- Tidal marshes restore/migrate
- Mudflat augmentation
- Submerged aquatic eelgrass
- Nearshore oyster reefs
- Rough Beaches
- Ecotone levees /clean waste and habitat migration space
- Creek-to-baylands connection
- Migration space for marshes
- Green stormwater infrastructure
- Existing ponds management

- Elevate the whole land
- Flood walls
- Seawalls
- Bulkheads
- Riprap or armoring shore
- Levees
- Levees with seawalls
- Elevate transportation